

REMARKS

Claims 8-14, 16, 19-20 are pending. Claims 21-63 are new. Claims 1-7, 15, 17 and 18 have been withdrawn from consideration. Unless otherwise mentioned herein, paragraph numbers refer to the specification as published as US 2004/0152122.

Support for the amendments to claims 8, 9, 10, 12, 14, and new claims 21-63 can be found throughout the specification including the Drawings and claims as filed originally. Particular support for each claim amendment and new claim is outlined below.

Claim 8: The claim has been amended so that the reaction vessel is configured as a *straight cylinder or tube*. The claim has been further amended to point out that the high and low temperature regions are positioned *within the straight cylinder or tube*. Particular support for the amendment can be found at ¶ [0057] (disclosing, for example, a “straight cylindrical reaction vessel” in reference to Figure 3). Further specific support can be found at ¶ [0062] (disclosing, for instance, a “straight tube” reaction vessel in reference to Figure 1).

Claim 14 was amended to improve claim clarity and dependency.

New claim 21 finds specific support in Figure 3A. As shown in the figure, the reaction vessel (103) is positioned vertically with respect to a heating device (104) and first and second conduction blocks (101, 102).

New claim 22 finds particular support in Figure 1. Among other things, the figure shows bidirectional thermal convection within the reaction vessel (6).

New claim 23 is supported by disclosure at ¶ [0073], for example. Additional support can be found in Figure 3. New claim 24 finds support at ¶ [0070], for instance.

New claim 25 is supported by the disclosure of ¶ [0088], for example.

New claim 26 is supported by Figure 1, for example. The figure discloses, among other things, convection region (5) positioned between the low temperature region (2) and the high temperature region (1).

New claim 27 finds support at ¶ [0057] in which a reaction vessel that includes a top and bottom is generally disclosed. Further support can be found at ¶¶ [0059, 0060, 0077, 0084, 0090], for instance. Still further support can be found in Figure 1 and Figure 3A (disclosing, among other things, reaction vessels with a bottom and a top end).

New claims 28-30 are specifically supported, for instance, by disclosure at ¶ [0057].

New claim 31 finds support in Figure 1, Figure 3A and ¶¶ [0062, 0084] which disclose, among other things, reaction vessels with a closed bottom end.

New claim 32 is supported by Figures 3A and 3B, for instance, which shows, among other things, an apparatus of the invention with multiple reaction vessels.

New claims 33-35, 37-41 were written along lines of claims 8 and 21-22, 27-31, respectively, except that the reaction vessel is featured as a *single straight channel*. The claims find support in sections of the specification already mentioned including Figures 1 and 3A which show, among other things, a reaction vessel that includes a single straight channel. New claim 36 finds particular support at ¶ [0057] and Figure 1.

New claim 42 was written along lines of claim 8 except that the heat source arrangement of the apparatus is further specified to provide for *relatively high temperature regions each located lower in height than a relatively low temperature region*. Particular support for the claim can be found in the Abstract, ¶¶ [0014], [0023], [0027], [0032], [0065], [0074], [0112], and Figure 2A (showing, for instance, heat sources providing for multiple high temperature regions positioned below a low temperature region).

New claims 43-45 are supported, for instance, by disclosure at ¶ [0065] and by Figures 1 and 2A. New claim 46 is supported by Figures 1 and 2A, for instance, showing positioning of a convection region between the high and low temperature regions.

New claim 47 was written along lines of claim 8, except that the heat source arrangement of the apparatus is further specified to provide for *relatively low temperature regions located lower in height than a relatively high temperature region*. Particular support for the claim can be

found, for example, in the Abstract, and ¶¶ [0014], [0023], [0027], [0032], [0065], [0074], [0112] and Figure 2B. New claims 48-51 are supported by the aforementioned disclosure as well.

New claim 52 was written along lines of claim 8 except that the *reaction vessel is featured as having one or two open ends*. The claim finds particular support in the figures, especially Figures 1, 2A and 2B. The figures show, among other things, reaction vessels with one or two open ends. New claim 53 is also supported by the aforementioned disclosure. New claim 54 is supported by disclosure at ¶ [0088], for example.

New claims 55-63 were written along lines of pending claims 9-14, 16 and 19-20.

No new matter has been added by virtue of the claim amendments or new claims.

Supplemental Information Disclosure Statement

Applicants respectfully request consideration of the present supplemental information disclosure statement. The cited references appear in the record of co-pending application no. 10/836,376 which application has formed the basis of a double patenting rejection on pg. 14 of the instant office action.

Applicants now address concerns raised in the Office Action in the order in which they appear in that paper.

Specification

At pgs 2-3 of the Office Action, bridging paragraph, the position was taken that replacement paragraph [0064] (provided in paper filed on 23 August 2006, hereinafter “prior response”) adds new matter i.e., the phrase “located at an upper portion of the sample”. Applicants respectfully disagree. The phrase “located at an upper portion of the sample” was inadvertently omitted during the English translation of the Korean PCT application (PCT/KR02/01728). The phrase has been added to the replacement paragraph [0064] (see underlined text as provided in the prior response) to correct the unintended omission. As such, the phrase is not new matter under 35 USC 132 (a). Reconsideration and withdrawal of the objection are requested.

Priority Under 35 USC §119

Applicants have submitted certified copies of Korean Application Nos. 10-2001-57040 and 10-2001-66943 (as filed on September 15, 2001 and October 30, 2001, respectively) along with corresponding English translations under separate cover. It is respectfully requested that the USPTO acknowledge Applicants' priority claims to these priority applications in the next office action.

Claim Objections

The Examiner objected to claims 9-10 and 12 on various informalities. The present submission is believed to address these issues. Reconsideration and withdrawal of the claim objections are requested.

Rejection of claims 8-9 and 19-20 under 35 USC §103(a) over Hunicke-Smith (WO 97/48818) and Benett et al. (WO 02/072267)

Claims 8-9 and 19-20 stand rejected over Hunicke-Smith and Benett. While Applicants respectfully disagree with the stated grounds of rejection, it is believed that the rejection has been addressed by this submission.

As an initial matter, Applicants respectfully disagree with the Office's reading of Benett. According to the Office (Action at pgs 7-8, bridging paragraph, emphasis added):

see page 5, lines 20-23 where Benett et al teach a relatively high temperature region called "Upper Temperature Zone 13" *located lower in height* than a relatively low temperature region called "Lower Temperature Zone 14".

Applicants have reviewed the entire Benett reference and can find no specific statement that the Upper Temperature Zone 13 is *lower in height* than the Lower Temperature Zone 14. At best, a fair reading of Benett would lead one to conclude that each of the cited zones is positioned separately in each of the channels 12a and 12c. Relative height position of one zone to the other, as alleged by the Examiner, is simply not disclosed by the reference. It is not seen how the reader could conclude that the Upper Temperature Zone 13 is located lower in height than the Lower Temperature Zone 14 from Benett as relied on since such a precondition is not needed to support the "convective siphon" action called for at pg. 5, line 22 of the reference. Moreover,

Figure 3 of Benett shows that the Upper Temperature Zone 13 is not located lower in height than the Lower Temperature Zone 14 since the zones clearly overlap at least according to the figure. None of the remainder of the Benett reference supports the statement captioned above. Accordingly, it is believed that no *prima facie* case of obviousness has been made by the Office and the rejection should be withdrawn.

Applicants disagree with the rejection on further grounds.

In particular, claim 8 has been amended to point out that the reaction vessel of the claimed apparatus is configured as a *straight cylinder or tube*. As relied on by the Office, Benett teaches a reaction vessel that is not a straight cylinder or tube at all. Instead, the cited reaction vessel is said to be a closed-loop chamber with multiple channels 12a, 12b, 12c, and 12d, supposedly for containing an upper temperature zone 13 and a lower temperature zone 14. See, for instance, Benett at Figures 1 and 3 and pg. 5, lines 16-22 as cited in the Action. Benett as cited does not teach or suggest how to make or use any apparatus that includes the reaction vessel featured in (amended) claim 8. Hunicke-Smith as relied on fails to remedy these deficiencies. On this ground alone, there is no basis for maintaining the rejection.

The apparatus of claim 8 is further distinguishable from the Examiner's combination of references in at least the following characteristics.

As cited, the Benett device is said to have the upper temperature zone 13 located in one of the two vertical channels 12a and 12c, and the lower temperature zone 14 located in another of the vertical channels. See, for instance, Figures 1 and 3 of Benett as relied on by the Office. In contrast, the heat sources of the apparatus of Applicants' claim 8 are arranged so that the high and low temperature regions are positioned within the same straight cylinder or tube. There is no specific teaching or suggestion in Benett as cited to create high and low temperature regions within the same straight cylinder or tube. Hunicke-Smith as relied on fails to remedy these deficiencies. On this basis alone, the rejection should be withdrawn.

Moreover, a worker would be dissuaded from modifying Benett as relied on so that the upper temperature region zone 13 and lower temperature zone 14 were in the same vertical channel as described in Figures 1 and 3 of the reference. Such a modification, if attempted at all,

would disrupt the “convective siphon” called for at pg. 5, line 22 of Benett. Hunicke-Smith as cited fails to overcome this deficiency. In marked contrast, the apparatus of claim 8 requires the high and low temperature regions to be in the same straight cylinder or tube so as to optimize spatial temperature distribution (thermal convection) within the reaction vessel. On this ground alone, it is believed that there is no basis for maintaining the rejection.

The apparatus of claim 8 is further distinguishable from the Examiner’s combination of references as set forth in the Action.

For instance, and as cited by the Office, the device depicted in Figure 1 of Benett has fluid flow that is constrained by the O-shaped structure of the closed-loop, multi-channel system shown. See also page 5, lines 19-22 of Benett. According to Benett, the flow thus made is unidirectional i.e., it moves together along the same direction through the multi-channel loop to generate a clockwise or counterclockwise flow that is guided by the channels. In marked contrast, the heat sources of the apparatus in Applicants’ claim 8 are arranged so that thermal convection occurs in the same straight cylinder or tube. Unlike the device cited from Benett, thermal convection flow is not significantly constrained by the reaction vessel of claim 8. Hunicke-Smith as cited fails to overcome these deficiencies in Benett.

In view thereof, reconsideration and withdrawal of the rejection are requested.

Applicants believe the new claims are also distinguishable over the Examiner’s combination of Hunicke-Smith and Benett. For instance, the references taken together or individually do not teach or suggest a reaction vessel with a single straight channel (claim 33); heat sources arranged so that high temperature regions are located lower in height than a low temperature region (claim 42); heat sources arranged so that a high temperature region is located lower in height than low temperature regions (claim 47); or a reaction vessel that has one or two open ends (claim 52). Favorable consideration of the new claims is earnestly requested.

Rejection of claims 10-12 and 14 under 35 USC §103(a) over Hunicke-Smith (WO 97/48818) and Benett et al. (WO 02/072267) further in view of Haff et al. (USP 5,720,923).

Applicants respectfully disagree with the stated reasons for rejecting claims 10-12 and 14. However, basis for the rejection has already been addressed by this submission.

In particular, the shortcomings of Hunicke-Smith and Bennett have already been discussed, particularly in reference to claim 8 (from which the rejected claims all depend). Haff as cited by the Office fails to remedy these deficiencies when taken alone or in combination with Hunicke-Smith and Bennett as relied on.

Accordingly, reconsideration and withdrawal of the rejection are requested.

Rejection of claims 12-13 under 35 USC §103(a) over Hunicke-Smith (WO 97/48818) and Bennett et al. (WO 02/072267) further in view of Northup (WO 98/25701).

Applicants respectfully disagree with the stated reasons for rejecting the claims. However, basis for the rejection has already been addressed by this submission.

In particular, the shortcomings of Hunicke-Smith and Bennett have already been discussed, particularly in reference to claim 8 (from which the rejected claims all depend). Northup as cited by the Office fails to remedy these deficiencies when taken alone or in combination with Hunicke-Smith and Bennett as cited.

Accordingly, reconsideration and withdrawal of the rejection are requested.

Rejection of claim 16 under 35 USC §103(a) over Hunicke-Smith (WO 97/48818) and Bennett et al. (WO 02/072267) further in view of Macho et al. USP 5,919,622.

Applicants respectfully disagree with the stated reasons for rejecting claim 16. However, basis for the rejection has already been addressed by this submission.

In particular, the shortcomings of Hunicke-Smith and Bennett have already been discussed, particularly in reference to claim 8 (from which the rejected claim depends). Macho as cited by the Office fails to remedy these deficiencies when taken alone or in combination with Hunicke-Smith and Bennett as cited.

Accordingly, reconsideration and withdrawal of the rejection are requested.

Double-Patenting Rejection

Applicants must respectfully disagree with the provisional double-patenting set forth on pg. 14 of the instant action. Applicants will address the rejection further, once there is indication of allowable subject matter.

Conclusion

Applicants believe that no further fee is due to consider the present amendment. Nevertheless, the Director is hereby authorized to charge or credit any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. **502486**.

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